

Protective, Edible, Milk-Based Film

A patent has been issued for a method to modify milk proteins to make water-resistant films that may one day coat or package foods. It uses highly pressurized carbon dioxide to remove the protein known as casein from milk. The main protein in milk, casein solidifies when milk acidifies. It is already used as a food supplement and as an ingredient in adhesives, finishing materials for paper and textiles, paints, and other non-food products. But because moisture can dissolve casein, it's been difficult to use in films, fibers, or molded materials and get acceptable mechanical properties.

The new extraction method capitalizes on casein's natural structure to form water-resistant films and coatings that can act as barriers between products and outside substances. The films can be formed either as stand-alone sheets or as thinner coatings that adhere directly to the product. Both can lock in moisture and remain intact when exposed to water.

Such edible coatings might be used on dairy food products such as cheese or be incorporated into packaging material. Flavorings, vitamins, or minerals could be added to the coating to enhance them. Researchers are still evaluating these and other potential uses, but the patent is available for licensing. *Peggy M. Tomasula, USDA-ARS Dairy Processing and Products Research Unit, Wyndmoor, Pennsylvania; phone (215) 233-6703, e-mail ptomasula@arserrc.gov.*

Bacteria Help Orchardists Replant Apples

Growers who are forced by changes in consumer tastes and buying habits to plant new apple varieties in old orchards are vulnerable to fungi that cause replant disease. The primary culprits are *Cylindrocarpus*, *Pythium*, *Phytophthora*, and *Rhizoctonia* fungi, which can cause losses up to \$40,000 per acre over an or-

chard's average production life. Chemical fumigants—including methyl bromide—have been the main defense against these disease-causing fungi. Now, with the approaching 2005 ban on methyl bromide use, development of efficient, cost-effective, nonchemical alternatives is of increasing importance.

Enter the bacterium *Pseudomonas putida*. It's an appealing alternative because it often occurs naturally around apple tree roots, secreting antibiotics that check troublesome fungi. A good thing about exploiting this native bacterium is that it's already established in orchards, so it just needs supplementation to increase its numbers. But since apple orchards may harbor many different replant disease fungi, researchers are testing other biological approaches, including various cultural practices and planting of hardier rootstock. *Mark Mazzola, USDA-ARS Tree Fruit Research Laboratory, Wenatchee, Washington; phone (509) 664-2280, e-mail mazzola@tfrrl.ars.usda.gov.*

Enviro-Friendly Treatment for Termites

A new termiticide containing low concentrations of naphthalenic compounds—similar to those used in mothballs—may soon be available to homeowners battling this wood-eating foe. Field tests in Mississippi and Louisiana have shown that it helps control both native subterranean and exotic Formosan subterranean termites. Control and repair costs for damage done by Formosan termites alone are up to around \$1 billion a year, added to the \$1 billion that native species cost.

Working with a counterpart in the USDA Forest Service, researchers are also checking to see whether these naphthalenic compounds can protect wood from fungal decay. It's important to find replacements for wood preservatives that now contain heavy metals such as arsenic, chromium, and copper. Certain of the test compounds have both

prevented wood decay and killed native termite colonies. They're incorporated into a cellulose-based matrix—a toxic bait that termites will eat and spread throughout the colony. The compounds are cheap and effective at very low concentrations and contain no heavy metals. Since a patent has been filed, the technology is now available for licensing. *M. Guadalupe Rojas and Juan A. Morales-Ramos are in the USDA-ARS Subterranean Termite Research Unit, New Orleans, Louisiana; phone (504) 286-4382 [Rojas], (504) 286-4256 [Morales-Ramos], e-mail grojas@srcc.ars.usda.gov, jmorales@srcc.ars.usda.gov.*

From Sheep Genes to Human Genes

A mutated sheep gene co-discovered with scientists at Duke University may provide clues to the roles of certain genes in human health. Named "callipyge," the gene was found in a flock of Oklahoma sheep in the early 1980s. Its expression gave the animals large muscling in their loins and legs. The feature was the result of expression of a normal copy of a specific gene from the mother and a mutated copy of the same gene from the father—an inheritance pattern known as paternal polar overdominance. This was its first known occurrence in a mammalian species.

This research shows the value of obtaining genomic sequences of more agricultural species to align with the human genome in the search for novel genes. Alignment of genomic sequences from several species could help identify important genetic regions not previously recognized in the human genome. This is especially true for regions containing mutations in livestock that have a major impact on the animal, such as the callipyge sheep gene. *Bradley A. Freking, USDA-ARS Genetics and Breeding Research Laboratory, Clay Center Nebraska; phone (402) 762-4278, e-mail freking@email.marc.usda.gov.*